Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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| In the Matter of | ) | |
| | ) | |
| Advanced Television Systems | ) | |
| and Their Impact Upon the | ) | MM Docket No. 87-268 |
| Existing Television Broadcast | ) | |
| Service | ) | |
| | ) | |
| Fifth Further Notice of | ) | |
| Proposed Rule Making | ) | |



# COMMENTS OF HITACHI AMERICA, LTD.

Jack S. Fuhrer
Senior Director

John G.N. Henderson
Chief Researcher

Hitachi America, Ltd.
307 College Road East
Princeton, NJ 08540
(609) 520-1320

## I. INTRODUCTION

Hitachi America, Ltd. (HAL) files the following comments in response to the Commission's Fifth Further Notice of Proposed Rule Making released on May 20, 1996 in the above-referenced proceeding.

Hitachi America, Ltd. (HAL) commends the Commission for fostering and guiding an ATV selection process that has led to the ATSC DTV Standard. HAL supports the Commission's proposal to adopt that Standard. HAL believes that the Grand Alliance system provides world leadership in technology and in provision for flexible evolution.

### Hitachi America, Ltd.

Hitachi America, Ltd. (HAL), with its North American subsidiaries, is a leading manufacturer of large-screen projection televisions, as well as VCRs, audio products, and other consumer devices related to the matter of this Advanced Television (ATV) proceeding. HAL has been deeply involved in the activities of the Commission's Advisory Committee on Advanced Television Service (ACATS) since its formation. Members of HAL's technical staff have chaired groups within the ACATS responsible for some specialized aspects of digital system testing, for analyzing the results of the transmission-related portions of the testing, for recommending the modulation format, and for documenting the video encoding system as part of ATSC's activities. In addition, HAL has made technical contributions and provided public demonstrations of its "All-Format Decoder" technology that is useful for HDTV and SDTV reception via inexpensive converter boxes for NTSC receivers and low-cost receivers of HDTV transmissions. HAL is acutely interested in these proceedings and files these comments from a perspective of deep involvement in the US ATV selection process.

## II. COMMENTS ON ISSUES RAISED IN THE FIFTH NOTICE OF PROPOSED RULE MAKING

### A. The ATSC DTV Standard should be adopted.

HAL heartily endorses the Commission's proposal to adopt the ATSC DTV Standard (NPRM ¶37). As the Commission notes (NPRM ¶7), the system embodied in that Standard has been thoroughly analyzed and tested in a concerted effort that included representatives of all relevant industries. The technology described in the Standard and the performance it offers are the best available world-wide. The Standard permits a degree of flexibility in service that is unprecedented and was certainly unanticipated at the beginning of the selection process.

### B. The Commission should require use of the ATSC DTV Standard.

The Commission asks (NPRM ¶29) whether requiring use of the ATSC Standard is the best approach. HAL believes that a required Standard is absolutely necessary in order to create a sufficiently solid basis to support the investments needed for design of transmission and reception equipment. A clear requirement for adherence to a standard is also indispensable in order to instill consumer purchasers with confidence in the long-term value of an investment in DTV. Conversely, if, after an unprecedented degree of cooperation among companies, industries, and government to develop and test the ATSC Standard, the Commission does not adopt it and require its use, it is doubtful that digital television will be established in the United States in any near future. The opportunities for improved television service, for more flexible broadcast business options, for new consumer services, and for spectrum efficiency and recovery will have been delayed or lost. A hard-won and, given the bleak outlook for US television technology at the start of the ATV process, surprising position of US world technological leadership in advanced television will also have been lost.

The Commission notes the arguments of critics and proponents of the ATSC Standard (NPRM ¶49-52). These arguments have focused principally on interlaced scanning, on frame rates, on flexibility, and on aspect ratio. HAL believes that the Standard emphasizes progressive scan; an interlaced format is included as a practical means of optimizing delivered image quality given today's camera, display, and compression technology. HAL believes that a 60 Hz refresh rate is appropriate for consumer entertainment displays, but notes further that the actual frame rates of displays are not limited by the Standard. HAL notes that service flexibility and interoperability with computer applications is "designed in" to the Standard and delivered to a degree unprecedented for a universal service. HAL notes that an aspect ratio of 16:9 is the result of world-wide consensus among all relevant industries; it also reflects the practical reality that CRT display tooling, in response to the world-wide consensus, has settled upon a 16:9 aspect ratio. HAL also agrees with the Commission (NPRM ¶54) that, given the openness of the process that led to the ATSC Standard, the burden of persuasion rests with those who now oppose the Standard.

The Commission asks (NPRM ¶27) whether the very strength of the consensus behind the ATSC Standard obviates the need for setting a required standard. HAL believes that simple reliance on consensus is not sufficient to preserve the kind of marketplace stability that consumers and manufacturers require. Over time, lack of a required Standard allows individual entities to attempt to establish proprietary systems or variants of the Standard that would fragment the service and confuse customers. HAL believes that the Commission must adopt a required Standard.

HAL notes that the required Standard that HAL believes is necessary includes the framework for a variety of new services. The Commission also notes the flexibility of the

ATSC Standard (NPRM ¶28). This means that setting a required Standard need not preclude additional new services in the future. However, a required Standard prevents new services from being arbitrarily restricted by proprietary technology or other artificial means that would frustrate a universal broadcast service. A requirement for operating within the ATSC Standard permits a variety of data and video services that are as yet undefined and even unimagined, and the Standard permits upgrades of video image quality via compliant improvements to encoders.

For the reasons stated in the preceding paragraphs, HAL believes that the Commission's concerns that making the ATSC Standard compulsory would stifle innovation and limit competition (NPRM ¶29) are unwarranted. The ATSC Standard, by design, encourages technical innovation within its framework. A compulsory Standard also encourages marketplace competition based on price, user interface convenience, and product performance and reliability. Absence of a compulsory Standard can actually encourage competition-limiting proprietary solutions that could try to create fragmented and limited markets.

The Commission expresses concerns about standardizing digital broadcasting technology while it is in its "infancy" (NPRM ¶33) and about a standard's ability to incorporate technological progress (NPRM ¶34). HAL notes that digital video compression using techniques similar to or directly included in the approaches embodied in the ATSC Standard has been the subject of world-wide development and standard-setting for at least 10 years. These compression techniques have been developed past "infancy." Moreover, they are deliberately designed to permit improvements in a fashion that continues the utility of existing decoders. HAL notes further that compression techniques not of the MPEG family of compression "tools" were considered in the selection process that led to the ATSC Standard; their performance was found lacking in

comparison with the selected Standard. Digital communication and the transmission of digital signals using techniques of QAM or VSB are also well-developed within the engineering community. The customizing of this technology to solve the unique problems of terrestrial transmission of television signals is a contribution of the developers of the ATSC Standard, but there is a sound basis for this design in established digital communication techniques. Although, as the Commission notes, development occurs constantly, fears of rapid advances that would soon obsolete the ATSC Standard are unwarranted.

C. The Commission should require use of each element of the ATSC DTV Standard.

The Commission asks comment on the option of requiring use of only some layers of the ATSC Standard (NPRM ¶48). HAL believes that the complete ATSC Standard, including all its elements, should be required. Only a complete Standard will assure the design and marketplace stability necessary for a successful new digital television service. HAL fully supports the Commission's proposal to require use by licensees of each element of the ATSC Standard (NPRM ¶37).

Similarly, HAL believes that it is not sufficient merely to prohibit interference to a new digital service or to adopt the Standard for allocation and assignment purposes only (NPRM ¶48).

D. The Standard should not be compromised or qualified by a "sunset provision" or a specific review period.

The Commission discussed options for a sunset provision (NPRM ¶46) or for selection of a specific date for review of the Standard (NPRM ¶45). HAL believes that these two options are unnecessary and unwise.

The ATSC Standard describes completely the means to achieve a new digital video service. It is essential for consumer entertainment video that purchasers see stability in the standard in order to justify their capital expenditures. If the Commission makes statements that explicitly call for review, the perception of stability is destroyed and, with it, the opportunity to promulgate the new service.

The Standard also provides data services, but, unlike the video, these services are not defined except at the transport layer. Such limited specification is appropriate for this portion of the Standard. Flexibility in this aspect follows established marketing practices for the computer and data service industries. It must be recognized that the history and consumer expectations of these industries are quite different from the entertainment video, i.e., television, experience.

There should be no confusion. The ATSC Standard permits flexibility in data services, and therefore requires no fixed period for review and no sunset provision. The ATSC Standard specifies the video system, and this specificity is required for this part of the new service; planned review periods or sunset provisions would be counter-productive.

E. The interoperability provisions of the ATSC Standard are entirely adequate.

The Commission asks if there are interoperability problems with the ATSC Standard or if there are actions the Commission should take to facilitate interoperability (NPRM ¶62). HAL believes that the degree of interoperability provided by the ATSC Standard is sufficient as written. HAL notes that the design of the system, which includes video and audio compression compatible with international standards and which emphasizes progressive scanning and square pixels, provides interoperability with a variety of existing and planned digital equipment, including computers. HAL notes further that the

testing applied to the hardware embodying the ATSC Standard included compatibility with MPEG video and transport standards and included test images generated by computer and typical of computer applications.

The Commission asks about delivery of the ATSC Standard signal by other media (NPRM ¶63) and specifically about cable (NPRM ¶64). The ATSC Standard recognizes the different channel characteristics and capacities of different delivery media and calls for two densities of VSB modulation (8-VSB and 16-VSB). The Commission notes concerns that cable may adopt QAM modulation instead of VSB. HAL believes that there is sufficient commonality between receiving demodulators for those two particular modulation types that a common receiver design is feasible.

The Commission also notes that some cable operators have suggested avoidance of B-frames (NPRM ¶64). HAL believes that such practice would be unwise and should not be permitted in a Standard established by the Commission. Receiver decoders designed without provision for B-frames would be unable to decode and display signals encoded with B-frames. Proliferation of such receivers would pressure video encoding to this new lowest common denominator, effectively removing the established quality improvement afforded by use of B-frames from the new digital service. B-frames should be included in the Standard

F. "All-format" receivers are necessary in order for a mixed service including both HDTV and SDTV to succeed.

HAL believes that all receivers of the new digital television service should be capable of decoding and displaying all transmitted signals. This is essential for consumer acceptance of the new service. In order to meet the needs of set-top decoders for existing NTSC receivers and to provide a variety of price points, a low-cost all-format

decoder is necessary. HAL believes that the consumer electronics manufacturers all recognize this need and will assure that equipment will be designed accordingly. Should this not be the case, however, the Commission may need to take steps to assure the availability of the new service and to avoid consumer confusion. HAL hopes that its public demonstrations have helped establish the existence of an effective all-format decoding technology.

## III. CONCLUSION

The advantages offered by the system defined by the ATSC Standard include spectrum recovery, new broadcast business opportunities, improved television delivery and image quality, new consumer services, and potential for growth in ways not yet defined. In order to obtain these advantages, the Commission must take a clear, unambiguous, and definitive stand. It must require use of all elements of the ATSC Standard. In so doing, it will provide for both business and consumers the stability needed for investment. The ATSC Standard offers the Commission an opportunity to codify a system with world technological leadership and the support of a wide range of participating businesses and industries. The Commission must seize this opportunity.

Respectfully submitted,

HITACHI AMERICA, Ltd.

By: _____
Jack S. Fuhrer
Senior Director

By: _____
John G.N. Henderson
Chief Researcher

307 College Road East
Princeton, New Jersey 08540
609-520-1320

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